

EPO - DG 1

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**CLAIMS**

1. An eccentric gearbox in which each external gear of the eccentric gear pairs, use minimum three eccentrics to maintain its orientation; the external gears are connected to the input shaft through eccentrics to guide the point of contact on the external gears and have their axes revolve around the axis of the input shaft; a common shaft is used to mount one of the eccentrics for each external gear used to maintain the orientation of the external gear; minimum three such common shafts are used to maintain the orientation of the external gears; internal gear rims are connected to the output shaft assembly and are coaxial with the output shaft; the output shaft assembly is free to rotate with respect to the fixed part; output shaft and the input shaft are coaxial; eccentrics connected to the same external gear have approximately same eccentricity; eccentrics connected to different external gears may have different eccentricities; by selecting different eccentric gear pairs, different speed ratios are selected between the input shaft and the output shaft.
2. An eccentric gearbox as claimed in claim 1 in which one of the common shafts, on which the eccentrics are mounted to maintain the orientation of the external gears, is used as input shaft; the shaft, which was stated as input shaft in claim 1 and is coaxial to the output shaft, is used to support the eccentrics for guiding the external gear; the eccentrics used for guiding the external gear are free to rotate on the supporting shaft.
3. An eccentric gearbox as claimed in claims 1 and 2 in which a gear engagement mechanism is used to engage at a time only one of the eccentrics, mounted on the input shaft, to the input shaft; other eccentrics on the input shaft are free to rotate with respect to the input shaft; all the internal gear rims are rigidly connected to the output shaft assembly.

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4. An eccentric gearbox as claimed in claims 1 and 2 in which a gear engagement mechanism is used to engage at a time only one internal gear rim to the output shaft assembly, other internal gear rims are free to rotate with respect to the output shaft assembly; all the eccentrics mounted on the input shaft, are rigidly connected to the input shaft.
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5. An eccentric gearbox in which every internal gear of the eccentric gear pair uses minimum three eccentrics to maintain its orientation; axes of internal gear revolve around axis of the output shaft; the external gears are coaxially connected to the output shaft; internal gears are connected to the input shaft assembly through eccentrics; eccentrics connected to the same internal gear have approximately same eccentricity; eccentrics connected to different internal gears may have different eccentricities; by selecting different gear pairs, different speed ratios are selected between the input shaft and the output shaft.
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6. An eccentric gearbox as claimed in claim 5 in which one of the eccentrics used for maintaining orientation of individual internal gears are mounted on a common shaft, and minimum three such common shafts are used; one of these shafts, with appropriate modification, is used as input shaft; these eccentrics are free to rotate on individual common shaft and a gear engagement mechanism is used to engage the input shaft at a time to only one of many eccentrics on the input shaft; external gears are rigidly connected to the output shaft and are coaxial to the output shaft.
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7. An eccentric gearbox as claimed in claim 5 in which one of the eccentrics for each internal gear, used to maintain the orientation of the internal gears, are mounted on a common shaft, and minimum three such common shaft assemblies are used; one of these shaft assemblies on which the eccentrics are rigidly mounted is used as input shaft; external gears are mounted on to the output shaft assembly and are coaxial to the
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output shaft; these external gears are free to rotate on the output shaft and a gear engagement mechanism is used to engage the output shaft at a time to only one of the external gears on the output shaft.

- 5 8. An eccentric gearbox in which the internal gears of the eccentric gear pairs use minimum three eccentrics to maintain their orientation; the external gears are coaxially connected to the output shaft; all the eccentrics connected to the same internal gear have approximately same eccentricity; eccentrics connected to different internal gears may have different eccentricities; by selecting different eccentric gear pairs, different speed ratios are selected between the input shaft and the output shaft; 10 number of, suitable spur gears, equal to that of internal gears are mounted on the input shaft; these spur gears drive the driven gears; these driven gears are coaxial to the axis of the output shaft; these driven gears are connected to separate eccentric disc, one for each internal gear, which guides the internal gears and thus the axis of the internal gear is guided to 15 revolve around the axis of the output shaft.
- 20 9. An eccentric gearbox as claimed in claim 8 in which the different eccentrics, used to maintain the orientation of the individual internal gears, are mounted on a common shaft and are either fixed to the shaft or free to rotate on the shaft; minimum number of such common shafts used is three.
- 25 10. An eccentric gearbox as claimed in claims 8 and 9 in which the spur gears, that are mounted on the input shaft are free to rotate on the shaft, only one of the gears at a time is engaged to the input shaft by gear engagement mechanism; external gears of the eccentric gear pairs are rigidly connected to the coaxial output shaft.
11. An eccentric gearbox as claimed in claims 8 and 9 in which the spur gears are rigidly mounted on the input shaft; external gears of the eccentric gear

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pairs are coaxially connected to the output shaft and are free to rotate on the output shaft; at a time only one of the external gears of the eccentric gear pairs is engaged to the output shaft by gear engagement mechanism.

- 5 12. An eccentric gearbox as claimed in claims 8 and 9 in which one of the common shafts having the eccentrics used for maintaining the orientation of the individual internal gear, is used for gear engagement mechanism; all the eccentrics on this shaft, used for maintaining orientation of the internal gear are free to rotate on the shaft; only one of the eccentric is  
10 engaged at a time to the shaft by gear engagement mechanism.
13. An eccentric gearbox as claimed in claims 1 to 12 in which two gear engagement mechanisms are used appropriately as to engage only one eccentric gear pair at a time between the input and output shaft; gears of other eccentric gear pairs are not engaged to either input shaft or output  
15 shaft.
14. An eccentric gearbox as claimed in claims 1 to 13 in which more than one identical eccentric gear pairs are used; with the help of additional eccentrics or some other mechanism, one or more eccentric gear pairs are engaged simultaneously to input and output shafts.
- 20 15. An eccentric gearbox as claimed in claim 1 to 14 in which the input shaft is used as output shaft and the output shaft is used as input shaft.
16. An eccentric gearbox as claimed in the claims 1 to 15 in which one or more eccentric gear pairs are used for getting different speed ratios between input and output shafts.
- 25 17. An eccentric gearbox as claimed in the claims 1 to 16 in which suitable lubrication scheme and bearings are used appropriately for reducing friction.

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18. An eccentric gearbox as claimed in the claims 1 to 17; which is used for obtaining multiple speed ratios between input and output shaft so that any one of the speed ratios can be selected for use.